

REMARKS/ARGUMENTS

The amendment to Claim 13 is supported at specification page 2, lines 28-34 and page 7, lines 2-9. These same portions of the specification support new Claims 28 and 29. The amendment to Claim 16 is supported at specification page 4, lines 29-32. Claim 22 has been clarified and Claims 23 and 27 have been amended consistent with the specification and the Examiner's interpretation. Claim 13 supports new Claims 30-35. No new matter has been entered.

As noted at specification page 1, bottom, and page 2, top, a major improvement in the field of polymer coatings would be to have a polymer composition that comprises an additive capable of migrating preferentially to where it is useful, i.e., the polymer/air surface, polymer/metal interface, polymer 1/polymer 2 interface, etc. In addition to this selective migration, the additive should exhibit sufficient compatibility with the polymer in order to avoid being easily washed away. In the field of coatings for metal surfaces, currently three layers are generally applied: the first being used for adhesion, the second providing the properties of the coating and, finally, the finishing layer providing the surface properties. Thus, the use, in a single layer, of a composition comprising additives which would migrate to where they are necessary would also be a very great technological advance.

The present invention provides just such a polymer composition, and provides the above benefits by virtue of the claimed combination of polymer (P1) and co-oligomer (O1).

As is well known in this art, an oligomer is different from a polymer, as detailed in the attached definition from the Polymer Science Dictionary. This difference has been brought out more fully in presently amended Claim 13 by specifying a difference in the number-average molar masses of polymer (P1) and co-oligomer (O1), the number-average molar mass of co-oligomer (O1) being less than or equal to 30,000. Moreover, Applicants have shown, in the present specification, the actual migration of the "additive" component of

their claimed composition (co-oligomer (O1)) by SEM and SEM-EDX, leading to, e.g., superior adhesion to metal surfaces as compared to similar compositions not containing co-oligomer (O1). See, for Example, Comparative Examples 5 and 6 and Examples 7-10 at specification pages 30ff and corresponding Figures 1-7. Notably, Comparative Example 5 provides poor performance with a polymer/oligomer combination where the oligomer is different from those presently claimed.

Demol, relied upon as the singular or primary reference in all outstanding rejections, does not use, suggest, or disclose an oligomer. Only polymers are disclosed and used. The Examiner has assigned the label of “co-oligomer” to the “supple” copolymer of vinylidene chloride. However, neither the “hard” nor the “supple” copolymers of vinylidene chloride disclosed in Demol are oligomers. In addition, and importantly, there is no suggestion in Demol that any change to an oligomer from the disclosed and used polymers could or would affect internal migration within a composition as claimed, nor is there any suggestion that such a change would provide the benefits described hereinabove with regard to, e.g., enhanced deposition/adhesion.

It is thus clear that there is no anticipation of the present claims by Demol, as Demol omits at least one of the presently claimed elements - co-oligomer (O1). Similarly, Demol does not render the present claims obvious, even when combined with the cited secondary references in support of rejections of certain dependent claims herein, because there is simply no suggestion in Demol to use a co-oligomer, as claimed and the Office has provided no reason for so doing. As noted in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007), citing *In re Kahn*, 78 USPQ2d 1329 (Fed. Cir. 2006), “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”

Because Demol does not signal, indicate, or suggest a change from the polymers disclosed and used in the reference to a co-oligomer as claimed, nor does the reference suggest that such a change, if made, could or would affect the internal migration of components within a polymer composition as claimed, or provide the benefits described herein with regard to enhanced deposition and adhesion, the outstanding rejections for anticipation and obviousness should be withdrawn and the claims passed to Issue.

As a final matter Applicants attach hereto the references listed in the Information Disclosure Statement and a new 1449.

Respectfully submitted,

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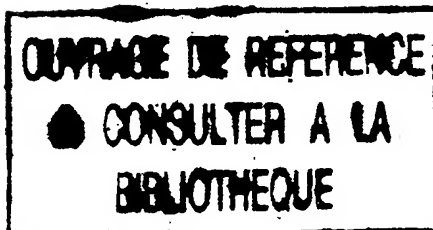
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# POLYMER SCIENCE DICTIONARY

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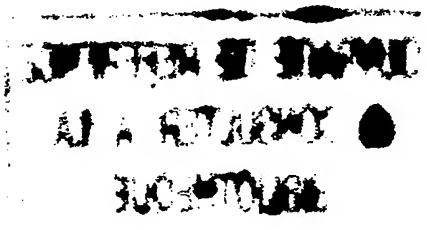
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***n*-OCTYL-*n*-DECYL ADIPATE (DNODA)**

B.p. 220–250°C/4 mm. The adipic acid esters of the mixed isomers of eight and ten carbon alcohols. Useful as a plasticiser for imparting good low temperature flexibility, with reasonable permanence, in polyvinyl chloride and its copolymers, cellulose esters, polystyrene and polyvinyl acetate.

**ODCB** Abbreviation for *o*-dichlorobenzene.

**OENANTHOLACTAM** Alternative name for enantholactam.

**OENR** Abbreviation for oil extended natural rubber.

**OGDEN'S THEORY** A theory of rubber elasticity based on the assumption that the strain energy function ( $W$ ) may be written in the very generalised form

$$W = \sum_n (\mu_n / \alpha_n) (\lambda_1^{\alpha_n} + \lambda_2^{\alpha_n} + \lambda_3^{\alpha_n} - 3)$$

where  $\alpha_n$  may have any value,  $\mu_n$  is a constant and  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$  are the principal extension ratios. This leads, for example, to the nominal stress ( $f$ ) in simple extension being given as

$$f = \sum_n \mu_n (\lambda_1^{\alpha_n - 1} - \lambda_1^{-\alpha_n/2})$$

Such results can provide good fits to the actual stress-strain behaviour (in pure shear and in equi-biaxial tension) with only a two term formula.

**OI** Abbreviation for oxygen index, which is an alternative name for limiting oxygen index.

**OIL EXTENDED NATURAL RUBBER (OENR)**

Natural rubber containing an oil extender, such as a petroleum oil, up to about 50 phr to reduce the product cost and/or to soften it.

**OIL EXTENDED RUBBER** A rubber to which a compatible oil has been added. Up to about 50 phr of a naphthenic, paraffinic or aromatic oil may be used especially in natural rubber (to give oil extended natural rubber), styrene-butadiene rubber and butadiene rubber. The oil may be added to decrease cost, but also acts as a plasticiser, softening the rubber and therefore acting as a processing aid and reducing stiffness in the vulcanisate.

**OIL LENGTH** The amount of drying oil (drying, semi-drying or non-drying) present in an alkyd resin. Resins may be classified according to oil length as short oil, medium oil or long oil resins.

**OIL MODIFIED ALKYD RESIN** What is usually meant by the term alkyd resin, i.e. a branched polyester of a dibasic acid (frequently phthalic anhydride) plus a polyol (frequently glycerol) modified by the incorporation

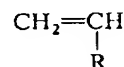
of the triglycerides of a natural plant oil. This improves solubility, enables air drying to occur and gives tougher films than with the unmodified resin.

**OLDROYD DERIVATIVE** (Codeformational derivative) Symbol  $d/dt$ . A time derivative operator for the transformation of convected to mixed coordinates in connection with rheological problems, whilst obeying the principle of objectivity. It is defined, in Cartesian coordinates, as,

$$d/dt \tau_{ij} = \partial \tau_{ij} / \partial t + u_i \partial u_j / \partial x_k - \tau_{ij} \partial u_i / \partial x_k - \tau_{ij} \partial u_j / \partial x_k$$

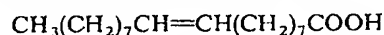
where  $\tau_{ij}$  are the shear stress components (using the summation convention),  $u_i$  are the velocity components and  $x_k$  the coordinate directions.

**$\alpha$ -OLEFIN** A compound of structure



where R is an alkyl or cycloalkyl group, i.e. an olefin substituted on the  $\alpha$ -carbon atom.  $\alpha$ -Olefins may be polymerised to poly( $\alpha$ -olefins), usually by Ziegler-Natta polymerisation to isotactic polymers. Examples include propylene (R =  $-\text{CH}_3$ ), butene-1 (R =  $-\text{CH}_2\text{CH}_3$ ), 4-methylpentene-1 (R =  $-\text{CH}_2\text{CH}(\text{CH}_3)_2$ ), hexene-1 (R =  $-(\text{CH}_2)_3\text{CH}_3$ ) and octene-1 (R =  $-(\text{CH}_2)_5\text{CH}_3$ ).

**OLEFIN FIBRE** Generic name for a fibre composed of a polymer with at least 85wt% of ethylene, propylene or other olefin units, excepting amorphous rubbery polymers. Examples are Courlene, Fibralon, Herculon and Vectra.

**OLEIC ACID** (*Cis*-9-octadecenoic acid)

M.p. 13.4°C ( $\alpha$ -form), 16.3°C ( $\beta$ -form).

Occurs in the triglycerides of most plant oils to a significant extent (5–25% of the acid residues). Although the double bond enables it to react with atmospheric oxygen, unlike linoleic acid it does not air dry.

**OLEORESIN** The initial exudation from certain trees when the bark is wounded. An oleoresin consists of a resinous component together with an essential oil. The latter usually evaporates, leaving the hard resin. Best studied is pine oleoresin, from which the resin rosin and the essential oil turpentine are obtained.

**OLIGOMER** A polymer with only a few repeat units in each polymer molecule, i.e. having a degree of polymerisation of up to a value of about 10–20. Thus dimers, trimers, tetramers, etc. are oligomers. Oligomers are formed during the early stages of step-growth polymerisation or after extensive random scission degradation of a polymer. They are also formed by a chain polymerisation when extensive chain transfer occurs.